CHIEF ENGINEERS ANNUAL REPORT

For year 1924

Tacoma, Washington
January 8, 1925

TO THE JOINT COMMISSION
INTER-COUNTY RIVER IMPROVEMENT

GENTLEMEN:

I have the honor to submit herewith my annual report for the year 1924, the expenditures for work performmed being shown on the attached itemized budget schedule.

At the Joint meeting held on March 10th, 1924, a revised budget for the year proposed by Mr. Thomson and myself amounting to $99,394.00 was submitted to and approved by your board. At the joint meeting on May 10th, your board authorized two items, $6,000.00 for the construction of a shear bulkhead at the confluence of the Stuck and Puyallup Rivers, and $1,500 for the construction of retards and mattress at Mellins Curve below the Stewart Bridge. These were added to the budged as items 23 and 24, making a total estimate for the year of $106,894.

WEATHER AND RIVER CONDITIONS

During the first part of the year 1924, from January to September we had the least rainfall of any year since records have been kept on Puget Sound and therefore, with the exception of a gradual spring runoff in February and March, experienced no difficulty in construction work. Beginning in October, however, we had an almost continual rainy season which interfered somewhat with the placing of revetment in the Reservation Section and resulted finally on December 11th and 12th in the highest water for the year, showing a stage of 10.9 feet at our gaging station.

The following is a detailed analysis of the work performed.

MUCKLESHOOT SECTION

Items 1 to 6 of the budget cover all of the work performed in this section, no expenditures being made on items 1 and 4 and very little on item 2. This is due to the excellent performance of the work done in 1923 under the plan adopted that year in the utilization of drift as a means of bank protection, and although there had been a small accumulation of drift,

it was decided after a conference with Mr. Thomson and the board to concentrate our efforts for the year in one section of about two miles.

I am very much pleased with the results obtained as they have performed exactly as we planned and I have no doubt eventually will be the means of holding the present banks in this section at a minimum of expense.

The work shown under item 5 at the Drift Barrier consists of the removal of all of the cables between piers 1 and 7 and such drift as had accumulated during the year, leaving a free opening through the Barrier for the maintenance of a sufficient channel at this point. Since the high water of December 12th, this entire section seems to be in much better shape to withstand a flood than heretofore.

AUBURN SECTION

Items 7 to 9 cover the work performed in this section, Item 7 being the extension of the cable pier barrier opposite the Auburn Dam, 715 feet costing $2,321.75. Item 8 covers the removal of drift in this section and also the construction of two retards opposite the Auburn Dam and a small cable pier barrier immediately above the old Wing Wall which went to pieces several years ago and was replaced with a gravel dyke. It was also neccessary to reinforce the old bulkhead on the right bank above the N.P. Bridge with cables and wire mesh and to build a drift retard where the banks were showing signs of serious erosion.

Item 9 is the payment to King County of the bonus for the removal of gravel above the N.P. Bridge.

COUNTY LINE SECTION

Work in this section consisted of the construction of two new retards, building up of three others and driving two wooden pile bulkheads and the removal of some accumulation of drift. The immediate danger to unprotected banks in this section has become somewhat improved by reason of the work done in 1923 and 1924. The ultimate solution of the problem here has been given a great deal of time and attention by Mr. Thomson and myself during the year and in order to make a more intelligent study of it, I have had made a very comprehensive survey and map showing the changes in donditions during the past ten years and as they exist today. We believe that we have finally arrived at a decision on the methods to be employed for the ultimate control of this portion of the river and will submit a report to your board with recommendations thereon in the near future.

The two bulkheads which were driven were used primarily as a means of protecting the banks and type 5 revetment on the left bank which was being very rapidly undermined, and although 10 bents were lost from one of these bulkheads in the high water of December 12th, they have accomplished the purpose for which they were built and will finally become part of the proposed permanent development.

DIERINGER SECTION

Work in this section is covered by items 11 to 14 inclusive and item 24, and consisted of building up and reinforcing twelve present retards; the construction of five new retards with a brush mattress laid between; 775 feet of new type 7 revetment above the Sumner Bridge, and repairing 265 feet of old revetment at the same location.

The concrete piles now carry this type of protection a total distance of 1,300 feet. That portion constructed in 1923 has withstood three high waters, is well silted in, and the willow brush mattresses have made quite a growth, preventing any erosion.

We experienced some difficulty with the revetment job at Sumner owing to the fact that it was necessary for us to excavate a channel in which to lay the greater portion of the mat, but in so doing used most of the material to build up banks to a very much more uniform alignment. This mattress also had to be carried down in front of the old type 5 revetment immediately above the bridge, and the toe of revetment built up with concrete and steel. These facts, together with the increased length of the new work, over ran our estimate somewhat but this particular curve is now in excellent shape and I believe permanent. Even Mr. Thomson admits that it is the best looking job on the river.

There is at the present time of old type 5 revetment in the Dieringer Section, 3,300 feet, and in the County Line Section, 10,200 feet, or a total of 13,500 feet, which is a continual source of anxiety and expense. In many places the toe blocks are being gradually undermined and dropping into the river. Four or five rows of these toe blocks were originally layed and there are now remaining in some instances only 1 row, and when the last toe blocks fail they invariably pull the slab with them necessitating immediate temporary repairs with retards or brush mats. All of the money expended under items 13 and 24 was for the temporary protection of typ

revetment. Neither Mr. Thomson nor myself have as yet been able to devise any means of making it more permanent.

ROESLI SECTION

Work in this section is covered by items 15, 16 and 23, there being no money expended under item 15. Item 16 provides for 900 feet of type 7 revetment above the North Puyallup Bridge, but in order to secure better alignment to connect up with existing work, it was necessary to place about 1,000 feet. The gravel for this job was taken from the bed of the river with one of our Fordson Bagley outfits as indicated on the photo of this work. Wrecking of old bulkheads and channel excavation for the mat were also done with the same equipment.

One of the most interesting pieces of work during the year was the construction of a shear bulkhead 680 feet long, at the confluence of the Stuck and Puyallup rivers, item 23, in an attempt to divert the channel of the Puyallup River by pushing the confluence of the rivers down stream and prevent further encroachment on the town of Sumner. This bulkhead was driven with our Fordson equipment and beginning at the shore, brush was placed between the rows of piles, gradually crowding the channel down stream to the end of the bulkhead. Six views of this work attached hereto show how rapidly the desired effect was accomplished, and the remarkable deposit of gravel in the old channel. Mr. Thomson and myself are very much gratified with this work as it was in a measure, very much of an experiment and the results far exceeded our highest expectations.

We also built on the right bank of the Stuck River, immediately opposite this bulkhead, three new retards and laid a heavy brush mattress between them and against the unprotected bank for a distance of about 1,000 feet.

The above, together with some minor repairs to bulkheads and revetment, covers all of the work in this section.

PUYALLUP SECTION

Work in the Puyallup Section consisted of repairs to old bulkheads and rebuilding of retards.

MURPHY SECTION

THe work in this section consists of some minor repairs to old bulkheads, placing a barrier between the south piers of the old Short Line Bridge , the construction of two retards, and item 17, 800 feet of type 7

revetment below the Short Line Bridge. The high water of December 12th has caused further erosion immediately below this new work, some of the old slab being undermined, and as the season progresses may necessitate more mattress and slab being laid at this point.

RESERVATION SECTION

The work in the Reservation Section is covered by items 18, 1,500 feet of type 7 revetment, later increased by authority of the Board to 2,650 feet; and item 22, for the raising of the levees on both banks of the river above the Highway Bridge. The type 7 revetment including the removal of old bulkhead #7, was placed at a very low unit cost and is an excellent piece of work. We also used our Bagley equipment here for taking gravel out of the river bed.

An arrangement was made with Pierce County by resolution of the Joint Board to utilize material from Roberts Hill for building up the levees, we to pay only the cost of hauling, but in no event to exceed a stipulated total amount of $7,060.50. Owing to the very early heavy fall rains, it was impossible to completely finish this work and the cost of hauling was thereby increased. There is still to be placed by Pierce County under the agreement, approximately 800 yards which Mr. Ball assures me will be done without additional cost to the Inter-County, in the Spring as soon as the levees are passable. The total amount actually paid on Inter-County payrolls on this account is $7,014.59.

Herewith is a statement showing total amounts, including 10% for Engineering and General Control, and unit costs on the various types of bank protection built during the year.

Work	Lin. ft.	Total cost	Cost per lin. ft.
Concrete pier barrier	715	$2,553.38	$3.60
Concrete pile bank protection	775	2,927.58	3.75
Type 7 Concrete revetment	5,180	44,540.53	8.65
Wood pile bulkheads	1,460	8,672.00	5.95

The following equipment was purchased during the year which was charged to and included in the above costs. The prices given are net amounts after allowing trade in value of old equipment.

Dodge Roadster	$ 1,084.25
1 Koehring Dandie Mixer	1,263.00
1 Sack Boss Mixer	782.00

1 Ford Truck	$ 729.00
1 Trailer	150.00
2 1½ H.P. Type ZA Bosch equipped engines 3 3 H.P " " " " "	308.40
3 1½ H.P. Type ZA Bosch equipped engines	183.30
1 4/6 Plain Fitted Duplex Piston Power Pump	363.45
Total	$4,843.49

The project is now well supplied with good equipment and it should not be necessary to purchase any during the year.

In conclusion I feel that I am justified in stating that we have accomplished a fairly large amount of permanent work during the year at comparatively low costs. We have developed several new types and plans of bank protection and channel control which in the judgement of both Mr. Thomson and myself, are effectually serving the purposes for which they were designed, and will ultimately be the means of effecting great economies in future years.

FINANCIAL STATEMENT

The latest financial statements of the two counties show the following fund balances.

King County	Nov. 30, 1924	$29,712.42
Pierce County	Nov. 30, 1924	1,720.82 deficit
	Total	27,991.60

Respectfully submitted,

H. F. Gronen
Chief Engineer
Inter-County River Improvement

HFG:AM

EXPENDITURES FOR MONTH OF

DECEMBER, 1924

ITEM	AMOUNT ALLOWED	TOTAL EXPENDED PREVIOUS MONTHS	EXPENDED CURRENT MONTH	TOTAL	REMARKS
1.	$ 1,000.00	.....	.....	.....	
2.	1,000.00	17.28	.....	17.28	
3.	1,000.00	1302.54	.....	1,302.54	
4.	800.00	.....	.....	.....	
5.	3,000.00	2,339.00	.....	2,339.00	
6.	2,000.00	2,138.73	.....	2,138.73	
7.	2,400.00	2,321.75	.....	2,321.75	
8.	4,000.00	3,156.09	.....	3,156.09	
9.	2,800.00	2,870.00	.....	2,870.00	
10.	6,000.00	5,478.34	.....	5,478.34	
11.	2,000.00	2,372.09	289.35	2,661.44	
12.	800.00	.....	.....	.....	
13.	600.00	1,340.43	.....	1,340.43	
14.	6,000.00	6,891.22	.....	6,891.22	
15.	500.00	.....	.....	.....	
16.	9,000.00	9,395.58	.....	9,395.58	
17.	6,400.00	6,458.49	.....	6,458.49	
18.	15,000.00	17,746.10	.....	17,746.10	
19.	5,000.00	3,136.61	337.31	3,473.92	
20.	10,000.00	3,195.65	1,940.11	5,135.76	
21.	10,000.00	8,924.95	973.57	9,898.52	
22.	10,094.00	9,383.59	700.00	10,083.59	
23.	6,000.00	6,281.20	.....	6,281.20	
24.	1,500.00	1,115.53	.....	1,115.53	
	$106,894.00	$95,865 .17	$4,240.34	$100,105.51	

H. F. Gronen
Chief Engineer
Inter-County River Improvement